



Phellodendron amurense



Integrating Bee Forage into Multi-Functional Planting

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The New Zealand Trees For Bees Research Trust



www.treesforbeesnz.org


Outline

- Introduction
- Multi-function bee forage
- Strategic plantations
- Beekeeper landowner partnerships



Overview of New Zealand Situation

Introduction

- 5 yr exponential  in hives (350k → 950k)
- High value premium honeys
- Problem of overstocked apiaries
- Need bee forage to support bee health

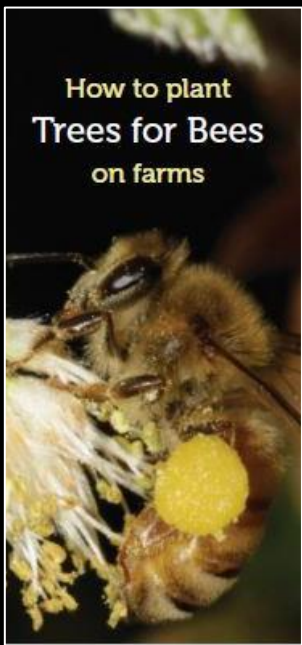


Public Education To Assist Bees

Maureen Conquer
Ambassador and
Beekeeper



- Schools, domestic gardens
- Community/regional parks
- Working with:
 - garden clubs
 - landscape designers
 - nurseries
 - farmers



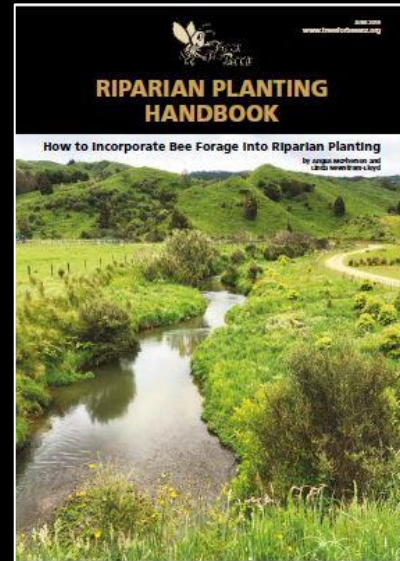
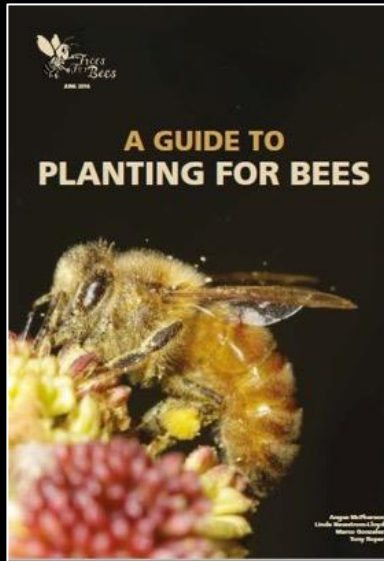


Ten Years of NZ Trees for Bees Research

Online tools:

NZ Bee Pollen Catalogue | Flower Catalogue | NZ Willow Identification Key

Download PDF:





Database started in 2009

- Field and literature data ~400 spp
- Flower and pollen photos
- Plant lists with features
- Lab analyses for pollen
 - crude protein % and fatty acid profiles

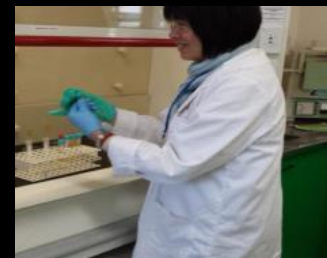
Dr. Linda
Newstrom-Lloyd
Trees for Bees
Botanist



Dr. Ian Raine
Palynologist
GNS Science



Dr. Xun Li
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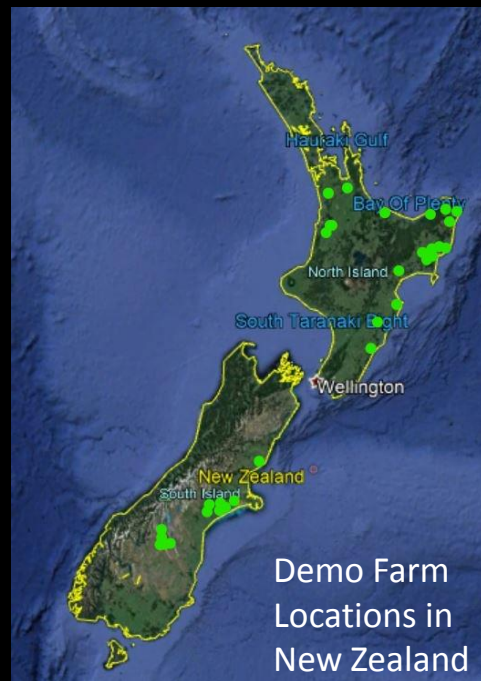




32 Demo Farms

- Planted **70,000** trees/shrubs
 - pastoral, arable, vineyards, parks
 - native bush, manuka plantations
- Goals for landowner + beekeeper
 - improve farm operations
 - fill bee forage gaps
 - increase bee carrying capacity
 - healthier bees while saving costs

Dr. Angus
McPherson
Farm Planting
Adviser





Multi-functional Plants

Riparian Plant
New Zealand Flax
(*Phormium tenax*)

- No set aside of land
- Integrate to land uses
 - shade and shelter
 - riparian protection
 - erosion control
 - orchards, gardens
 - amenity etc.



35 to 40 % protein
in pollen

Photo by Finn Scheele



Strategic Planting for Maximum Nutrition

- **Balanced**
→ no bee forage gaps
- **Targeted**
→ no bee distractions

39 %
protein in
pollen

Crab apple
Malus sieboldii





Tools for Planning Bee Plantations

- Plant lists in database
- Flowering calendars
- Bee forage profile charts

Hawthorn (*Crataegus* spp.) - 25 to 29 % protein in pollen

Photo by Valentine Toulon



Database with Flowering Times

Biostatus	Botanical Name	Common Name	Winter/Early Spring				Spring/Early Summer		Summer				Early Winter	
			June	July	August	September	October	November	December	January	February	March	April	May
Native	<i>Fuchsia excorticata</i>	Tree fuchsia	1	1	1	1	1	1	1	1				
Native	<i>Melicytus lanceolatus</i>	Narrow-leaved mahoe	1	1	1	1	1	1	1					
Native	<i>Pseudopanax arboreus</i>	Five-finger	1	1	1									
Native	<i>Metrosideros carminea</i>	Crimson rata			1	1	1							
Native	<i>Leptospermum</i>	Manuka				1	1	1	1	1	1	1		
Native	<i>Kunzea ericoides</i>	Kānuka				1	1	1	1	1	1			
Native	<i>Pittosporum umbellatum</i>	Haekaro				1	1	1	1	1				
Native	<i>Pittosporum ralphii</i>	Ralph's Kohuhu	x			1	1	1	1	x	x	x	x	x
Native	<i>Pittosporum crassifolium</i>	Karo				1	1	1	1					
Native	<i>Weinmannia silvicola</i>	Kāmahi				1	1	1	1					
Native	<i>Metrosideros diffusa</i>	Rata vines					1	1	1	1				
Native	<i>Olearia furfuracea</i>	Tanguru					1	1	1	1				
Native	<i>Pittosporum eugenioides</i>	Lemonwood					1	1	1					
Native	<i>Knightia excelsa</i>	Rewarewa					1	1	1					
Native	<i>Cordyline australis</i>	Cabbage tree					1	1	1					
Native	<i>Carpodetus serratus</i>	Marble leaf						1	1	1	1	1		
Native	<i>Pennantia corymbosa</i>	Kahikōmako						1	1	1	1			
Native	<i>Melicytus ramiflorus</i>	Whiteywood						1	1	1	1			
Native	<i>Metrosideros umbellata</i>	Southern rata						1	1	1	x	x		
Native	<i>Ixerba brexioides</i>	Tāwari						1	1	1				
Native	<i>Metrosideros robusta</i>	Northern rata						1	1	1				
Native	<i>Phormium tenax</i>	NZ flax						1	1					



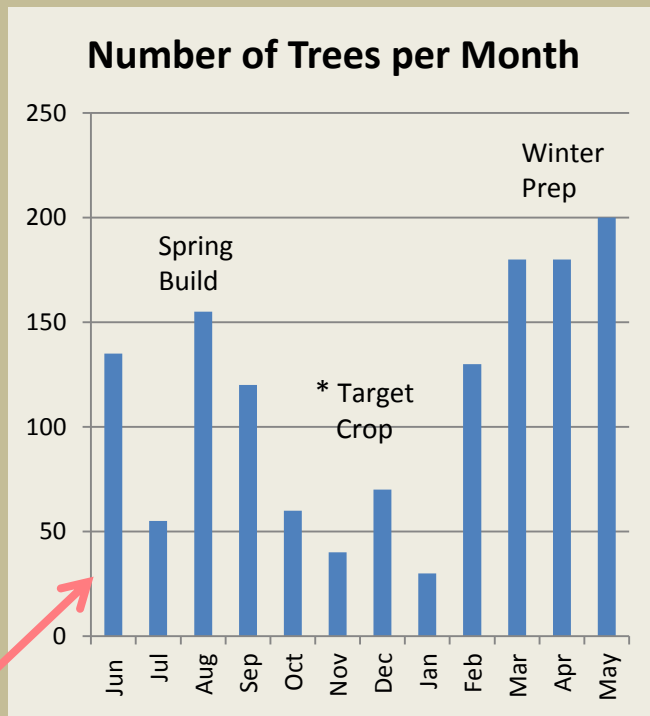
Select Bee Plants and Make Chart

Flowering Calendar for Planting Plan



Bee Forage Profile Chart

NUMBER OF TREES		JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
<i>Leptospermum scoparium</i>	Mānuka					*	*	*	*				
1	<i>Pittosporum eugenioides</i>					40	40	40					
2	<i>Pseudopanax arboreus</i>	35	35	35									
3	<i>Vitex lucens</i>	20	20	20	20	20							20
4	<i>Hebe stricta</i>									100	100	100	100
5	<i>Coprosma robusta</i>			100	100								
6	<i>Pseudopanax lessonii</i>							30	30	30			
7	<i>Hoheria populnea</i>	40									40	40	40
8	<i>Hoheria sexstylosa</i>	40									40	40	40
Total plants flowering each month		135	55	155	120	60	40	70	30	130	180	180	200





We Solved Spring Pollen Dearth Crash

After willow, before clover

Used north temperate trees

Diversity: maples, oaks, ash, etc.

Maple (*Acer truncatum*) - 25 % protein in pollen

Photo by Jean-Noel Galliot



Why Trees?

more pollen & nectar

- Vertical mass of flowers
- Long-lived -- 50 to 100 yrs
- Low to no maintenance



2016 Tietjen Vineyard with Tawari Apiaries in Gisborne

Barry Foster
Ambassador
& Beekeeper



Landowner and beekeeper planting an avenue of tulip trees (*Liriodendron tulipifera*)





2017 Amenity Planting Tietjen Vineyard - Tawari Apiaries

Avenue of Chinese Hill cherries and Yoshino cherries for wine festivals



Duck pond planted with oaks (acorns), ornamental pears and crab apples for ducks and bees





2018 Shelter Belt at Tietjen Vineyard



*Michelia
yunnanensis*
for very early
spring flowering

A visit
by Chloe Swarbrick
Member NZ Parliament
with Landowner Paul Tietjen
and Beekeeper Barry Foster



Erosion Control Using Tagasaste Waioma Sheep and Beef Farm - Tawari Apiaries

2014 planted Tagasaste on ridge of eroded hill

2019 the planted trees "seeded down" the slope





Star Performer Tagasaste (*Chamaecytis palmensis*)

Long flowering from late winter to spring

Multi-purpose legume; pollen protein 35 %



REF: Newstrom-Lloyd & McPherson . Star Performers Part 6:
Tagasaste for Winter and Early Spring. *The New Zealand Beekeeper*
February 2018



Next steps → Extension and Training

Expand online tools:

- Bee Pollen Catalogue
- Flower Catalogue
- Planting Handbooks

Create new online tools:

- Design Templates
- Plant Selector Tool
- Auto-Charts for Profiles

www.treesforbeesnz.org/onlinetools



Major Grants and Sponsors

Ministry for Primary Industries
Manatū Ahu Matua



MPI Sustainable Farming Fund
4 grants from 2010 to 2022

